



4 C

## SEQUENCE LISTING

&lt;110&gt; DIVERSITY CORPORATION

ROBERTSON, Dan

SANYAL, Indrajit

ADHIKARI, Robert

&lt;120&gt; CATALASES

&lt;130&gt; DIVER1100-4

&lt;140&gt; US 09/884,889

&lt;141&gt; 2001-06-19

&lt;150&gt; US 09/412,347

&lt;151&gt; 1999-10-05

&lt;150&gt; US 08/951,844

&lt;151&gt; 1997-10-16

&lt;150&gt; US 08/674,887

&lt;151&gt; 1996-07-03

&lt;160&gt; 8

&lt;170&gt; PatentIn version 3.0

&lt;210&gt; 1

&lt;211&gt; 52

&lt;212&gt; DNA

&lt;213&gt; Artificial sequence

&lt;220&gt;

&lt;223&gt; Primer for PCR

&lt;400&gt; 1

ccgagaattc attaaagagg agaaaattaac tatgaataac gcatccgctg ac

52

&lt;210&gt; 2

&lt;211&gt; 31

&lt;212&gt; DNA

&lt;213&gt; Artificial sequence

&lt;220&gt;

&lt;223&gt; Primer for PCR

&lt;400&gt; 2

gcaaagctgc agcgcagcat tttcgaaagg c

31

&lt;210&gt; 3

&lt;211&gt; 52

&lt;212&gt; DNA

&lt;213&gt; Artificial sequence

&lt;220&gt;

&lt;223&gt; Primer for PCR

&lt;400&gt; 3

ccgagaattc attaaagagg agaaaattaac tatggaaaat cacaaacact ca

52

<210> 4  
<211> 31  
<212> DNA  
<213> Artificial sequence

<220>  
<223> Primer for PCR

<400> 4  
ctggccaaac tagactttat tccatggaag c

31

<210> 5  
<211> 2262  
<212> DNA  
<213> Alcaligenes (Deleya) aquamarinus

<400> 5						
atgaataaac	catccgctga	cgatctacac	agtagcttgc	agcaaagatg	cagagcattt	60
gttcccttg	tatcgccaag	gcatacgagca	ataaggaga	gagctatgag	cggtaaatgt	120
cctgtcatgc	acgggtgtaa	cacctcgacc	ggtacttcca	acaaagattg	gtggccggaa	180
gggttgaacc	tggatatttt	gcatcagcaa	gatcgcaaat	cagaccggat	ggatccggat	240
ttcaactacc	gtgaagaagt	acgcaagctc	gatttcgacg	cgctgaagaa	agatgtccac	300
gcgttcatgt	ccgatagcca	agagtggtgg	cccgcgtact	gggggcacta	cggcggtttg	360
atgatccgta	tggcttggca	ctccgctggc	acctaccgta	ttgctgatgg	ccgtgggggc	420
ggtgttaccg	gaagccagcg	ctttgcacccg	ctcaactcct	ggccggacaa	cgtcagcctg	480
gataaagcgc	gccgtctgct	gtggccgatc	aagaagaagt	acggcaacaa	aatcagctgg	540
gcagacctga	tgattctggc	tggcaccgtg	gcttatgagt	ccatgggctt	acctgcttac	600
ggcttctctt	tcggccgcgt	cgatatttgg	gaacccgaaa	aagatatcta	ctggggtgac	660
aaaaaaagagt	ggctggcacc	ttctgacgaa	cgctacggcg	acgtgaacaa	gccagagacc	720
atggaaaacc	cgctggcggc	tgtccaaatg	ggtctgatct	atgtgaaccc	ggaaggtgtt	780
aacggccacc	ctgatccgct	gagaaccgca	cagcaggtac	ttgaaacctt	cggccgtatg	840
gcgatgaacg	acgaaaaaac	cgcagccctc	acagctggcg	gccacaccgt	cgttaattgt	900
cacggtaatg	gcaatgcctc	tgcgttagcc	cctgacccaa	aagcctctga	cgttggaaaac	960
cagggcttag	gttggggcaa	ccccaacatg	cagggcaagg	caagcaacgc	cgtgacctcg	1020
ggtatcgaag	gtgcttggac	caccaacccc	acgaaattcg	atatggcta	tttcgacctg	1080
ctgttcggct	acaattggga	actgaaaaag	agtccctgccc	gtgcccacca	ttgggaaccg	1140
attgacatca	aaaaggaaaa	caagccggtt	gacgccagcg	acccctctat	tcgcccacaac	1200
ccgatcatga	ccgatgcgga	tatggcgata	aaggtaaatac	cgacctatcg	cgctatctgc	1260

gaaaaattca	tggccgatcc	tgagtacttc	aagaaaactt	tcgcgaaggc	gtggttcaag	1320
ctgacgcacc	gtgacctggg	cccgaaatca	cgttacatcg	gcccggaagt	gccggcagaa	1380
gacctgattt	ggcaagaccc	gattccggca	ggtaacacccg	actactgcga	agaagtggtc	1440
aagcagaaaa	ttgcacaaag	tggcctgagc	attagtgaga	tggtctccac	cgcttggac	1500
agtccccgt	cttatcgccg	ttccgatatg	cgcggcggtg	ctaacggtgc	ccgcattcgc	1560
ttggccccac	agaacagagt	gcagggcaac	gagccggagc	gcctggcgaa	agtgctgagc	1620
gtctacgaggc	agatctctgc	cgacaccggc	gctagcatcg	cggacgtgat	cgttctggcc	1680
ggtagcgtag	gcatcgagaa	agccgcgaaa	gcagcagggt	acgatgtgcg	cgttcccttc	1740
ctgaaaggcc	gtggcgatgc	gaccgcccag	atgaccgacg	cagactcctt	cgcaccgctg	1800
gagccgctgg	ccgatggctt	ccgcaactgg	cagaagaaaag	agtatgtggt	gaagccggaa	1860
gagatgctgc	tggatcggtgc	gcagctgatg	ggcttaaccg	gcccgaaaat	gaccgtgctg	1920
ctggcggt	tgcgcgta	gggcaccaac	tatggtggca	ccaaacacgg	cgtattcacc	1980
gattgtgaag	gccagttgac	caacgacttt	tttgtgaacc	tgaccgatat	gggaacagc	2040
tggaagccgg	tagtagcaa	cgcctacgaa	atccgcgacc	gcaagaccgg	tgccgtgaag	2100
tggaccgcct	cgcggtgga	tctggtattt	ggttccaact	cgctactgctg	ctcttacgca	2160
gaagtgtacg	cccaggacga	taacggcgag	aagttcgtca	gagacttcgt	cgccgcctgg	2220
accaaagtga	tgaacgccga	ccgtttcgac	gtcgcgtcgt	aa		2262

<210> 6  
 <211> 753  
 <212> PRT  
 <213> Alcaligenes (Deleya) aquamarinus

<400> 6

Met Asn Asn Ala Ser Ala Asp Asp Leu His Ser Ser Leu Gln Gln Arg  
 1 5 10 15

Cys Arg Ala Phe Val Pro Leu Val Ser Pro Arg His Arg Ala Ile Arg  
 20 25 30

Glu Arg Ala Met Ser Gly Lys Cys Pro Val Met His Gly Gly Asn Thr  
 35 40 45

Ser Thr Gly Thr Ser Asn Lys Asp Trp Trp Pro Glu Gly Leu Asn Leu  
 50 55 60

Asp Ile Leu His Gln Gln Asp Arg Lys Ser Asp Pro Met Asp Pro Asp  
 65 70 75 80

Phe Asn Tyr Arg Glu Glu Val Arg Lys Leu Asp Phe Asp Ala Leu Lys  
 85 90 95

Lys Asp Val His Ala Leu Met Thr Asp Ser Gln Glu Trp Trp Pro Ala

100

105

110

Asp Trp Gly His Tyr Gly Gly Leu Met Ile Arg Met Ala Trp His Ser  
 115 120 125

Ala Gly Thr Tyr Arg Ile Ala Asp Gly Arg Gly Gly Gly Thr Gly  
 130 135 140

Ser Gln Arg Phe Ala Pro Leu Asn Ser Trp Pro Asp Asn Val Ser Leu  
 145 150 155 160

Asp Lys Ala Arg Arg Leu Leu Trp Pro Ile Lys Lys Lys Tyr Gly Asn  
 165 170 175

Lys Ile Ser Trp Ala Asp Leu Met Ile Leu Ala Gly Thr Val Ala Tyr  
 180 185 190

Glu Ser Met Gly Leu Pro Ala Tyr Gly Phe Ser Phe Gly Arg Val Asp  
 195 200 205

Ile Trp Glu Pro Glu Lys Asp Ile Tyr Trp Gly Asp Glu Lys Glu Trp  
 210 215 220

Leu Ala Pro Ser Asp Glu Arg Tyr Gly Asp Val Asn Lys Pro Glu Thr  
 225 230 235 240

Met Glu Asn Pro Leu Ala Ala Val Gln Met Gly Leu Ile Tyr Val Asn  
 245 250 255

Pro Glu Gly Val Asn Gly His Pro Asp Pro Leu Arg Thr Ala Gln Gln  
 260 265 270

Val Leu Glu Thr Phe Ala Arg Met Ala Met Asn Asp Glu Lys Thr Ala  
 275 280 285

Ala Leu Thr Ala Gly Gly His Thr Val Gly Asn Cys His Gly Asn Gly  
 290 295 300

Asn Ala Ser Ala Leu Ala Pro Asp Pro Lys Ala Ser Asp Val Glu Asn  
 305 310 315 320

Gln Gly Leu Gly Trp Gly Asn Pro Asn Met Gln Gly Lys Ala Ser Asn  
 325 330 335

Ala Val Thr Ser Gly Ile Glu Gly Ala Trp Thr Thr Asn Pro Thr Lys  
 340 345 350

Phe Asp Met Gly Tyr Phe Asp Leu Leu Phe Gly Tyr Asn Trp Glu Leu  
 355 360 365

Lys Lys Ser Pro Ala Gly Ala His His Trp Glu Pro Ile Asp Ile Lys  
 370 375 380

Lys Glu Asn Lys Pro Val Asp Ala Ser Asp Pro Ser Ile Arg His Asn  
 385 390 395 400

Pro Ile Met Thr Asp Ala Asp Met Ala Ile Lys Val Asn Pro Thr Tyr  
 405 410 415

Arg Ala Ile Cys Glu Lys Phe Met Ala Asp Pro Glu Tyr Phe Lys Lys  
 420 425 430

Thr Phe Ala Lys Ala Trp Phe Lys Leu Thr His Arg Asp Leu Gly Pro  
 435 440 445  
 Lys Ser Arg Tyr Ile Gly Pro Glu Val Pro Ala Glu Asp Leu Ile Trp  
 450 455 460  
 Gln Asp Pro Ile Pro Ala Gly Asn Thr Asp Tyr Cys Glu Glu Val Val  
 465 470 475 480  
 Lys Gln Lys Ile Ala Gln Ser Gly Leu Ser Ile Ser Glu Met Val Ser  
 485 490 495  
 Thr Ala Trp Asp Ser Ala Arg Thr Tyr Arg Gly Ser Asp Met Arg Gly  
 500 505 510  
 Gly Ala Asn Gly Ala Arg Ile Arg Leu Ala Pro Gln Asn Glu Trp Gln  
 515 520 525  
 Gly Asn Glu Pro Glu Arg Leu Ala Lys Val Leu Ser Val Tyr Glu Gln  
 530 535 540  
 Ile Ser Ala Asp Thr Gly Ala Ser Ile Ala Asp Val Ile Val Leu Ala  
 545 550 555 560  
 Gly Ser Val Gly Ile Glu Lys Ala Ala Lys Ala Ala Gly Tyr Asp Val  
 565 570 575  
 Arg Val Pro Phe Leu Lys Gly Arg Gly Asp Ala Thr Ala Glu Met Thr  
 580 585 590  
 Asp Ala Asp Ser Phe Ala Pro Leu Glu Pro Leu Ala Asp Gly Phe Arg  
 595 600 605  
 Asn Trp Gln Lys Lys Glu Tyr Val Val Lys Pro Glu Glu Met Leu Leu  
 610 615 620  
 Asp Arg Ala Gln Leu Met Gly Leu Thr Gly Pro Glu Met Thr Val Leu  
 625 630 635 640  
 Leu Gly Gly Met Arg Val Leu Gly Thr Asn Tyr Gly Gly Thr Lys His  
 645 650 655  
 Gly Val Phe Thr Asp Cys Glu Gly Gln Leu Thr Asn Asp Phe Phe Val  
 660 665 670  
 Asn Leu Thr Asp Met Gly Asn Ser Trp Lys Pro Val Gly Ser Asn Ala  
 675 680 685  
 Tyr Glu Ile Arg Asp Arg Lys Thr Gly Ala Val Lys Trp Thr Ala Ser  
 690 695 700  
 Arg Val Asp Leu Val Phe Gly Ser Asn Ser Leu Leu Arg Ser Tyr Ala  
 705 710 715 720  
 Glu Val Tyr Ala Gln Asp Asp Asn Gly Glu Lys Phe Val Arg Asp Phe  
 725 730 735  
 Val Ala Ala Trp Thr Lys Val Met Asn Ala Asp Arg Phe Asp Val Ala  
 740 745 750

Ser

<210> 7  
 <211> 2238  
 <212> DNA  
 <213> Microscilla furvescens

<400> 7	
atggaaaatc acaaacactc aggatcttct acgtataaca caaacactgg cgaaaaatgc	60
ccttttaccg gaggttcgct taagcaaagt gcaggtggcg gcaccaaaaa cagggattgg	120
tggcccaaca tgctcaacct cggcatctta cgccaacatt catcgctatc ggacccaaac	180
gaccggatt ttgactatgc cgaagagttt aagaagctag atctggcagc ggttaaaaag	240
gacctggcag cgctaattgac agattcacag gactggtggc cagcagatta cggtcattat	300
ggccccttct ttatacgcac ggcgtggcac agcgccggca cctaccgtat cggtgatggc	360
cgtggtggcg gtggctccgg ctcacagcgc ttcgcgcctc tcaatagctg gccagacaat	420
gccaatctgg ataaagcacg cttgcttctt tggcccatca aacaaaaata cggtcgaaaa	480
atctcctggg cggatctaata gatactcaca ggaaacgtag ctctggaaac tatgggcttt	540
aaaacttttg gtttgcagg tggcagagca gatgtatggg agcctgaaga agatgtatac	600
tggggagcag aaaccgaatg gctgggagac aagcgctatg aaggtgaccg agagctcgaa	660
aatccccctgg gagccgtaca aatgggactc atctatgtaa accccgaagg acccaacggc	720
aagccagacc ctatcgctgc tgcgctgtat attcgtgaga cttttggccg aatggcaatg	780
aatgacgaag aaaccgtggc tctcatagcg ggtggacaca ctttcggaaa aacccatgg	840
gctgccatcg cggagaaata tgtggccga gagcctgccc ccgcaggat tgaagaaatg	900
agcctggggt ggaaaaacac ctacggcacc ggacacggtg cgataccat caccagtgg	960
ctagaaggcg cctggaccaa gaccctact caatggagca ataactttt tgaaaacctc	1020
tttggttacg agtgggagct taccaaaagt ccagctggag cttatcagtg gaaaccaaaa	1080
gacggtgccg gggctggcac cataccggat gcacatgatc ccagcaagtc gcacgctcca	1140
tttatgctca ctacggacct ggcgctgcgc atggaccctg attacgaaaa aatttctcga	1200
cgtactatcg aaaaccctga ttagttgca gatgcttgc cgaaagcatg gtacaaactg	1260
acacacagag atatgggacc aaaggtgcgc tacctggac cagaagtgcc tcaggaagac	1320
ctcatctggc aagaccctat accagatgta agccatcctc ttgttagacga aaacgatatt	1380
gaaggcctaa aagccaaaat cctggaatcg ggactgacgg taagcgagct ggtaagcacg	1440
gcatgggctt ctgcacatctac ttttagaaac tctgacaagc gcggcggtgca caacggtgca	1500
cgtatacgcac tggccccaca aaaagactgg gaagtaaaca accctcagca acttgccagg	1560

gtactcaaaa cactagaagg tatccaggag gactttaacc aggcgcaatc agataacaaa	1620
gcagtatcg tggccgacct gatttgctg gccggctgtg cgggtgtaga aaaagctgca	1680
aaagatgctg gccatgaggt gcaggtgcct ttcaacccgg gacgagcgg tgccaccgct	1740
gagcaaaccg atgtggaagc tttcgaagca ctagagccag cggctgacgg cttagaaac	1800
tacattaaac cgagcataa agtatccgct gagaaatgc tcgtagaccc ggcgcagctt	1860
ctgtcgctt cggcaccaga aatgactgct ttggtaggcg gtatgcgtgt actgggcacc	1920
aactacgacg gttcgcagca tggagtgttt acaaataagc cgggtcagct atccaatgac	1980
ttctttgtaa acctgctaga cctcaacact aaatggcgag ccagcgatga atcagacaaa	2040
gttttgaag gcagagactt caaaactggc gaagtaagt ggagtggcac ccgggttagac	2100
ctgatcttcg gatccaattc cgagctaaga gccctcgac aagtgtacgg ctgtgcagat	2160
tctgaagaaa agtttgtaa agattttgtg aaggcctggg ccaaagtaat ggacctggac	2220
cggtttgatc tgaaataa	2238

<210> 8  
<211> 745  
<212> PRT  
<213> Microscilla furvescens

<400> 8

Met Glu Asn His Lys His Ser Gly Ser Ser Thr Tyr Asn Thr Asn Thr			
1	5	10	15
Gly Gly Lys Cys Pro Phe Thr Gly Gly Ser Leu Lys Gln Ser Ala Gly			
20	25	30	
Gly Gly Thr Lys Asn Arg Asp Trp Trp Pro Asn Met Leu Asn Leu Gly			
35	40	45	
Ile Leu Arg Gln His Ser Ser Leu Ser Asp Pro Asn Asp Pro Asp Phe			
50	55	60	
Asp Tyr Ala Glu Glu Phe Lys Lys Leu Asp Leu Ala Ala Val Lys Lys			
65	70	75	80
Asp Leu Ala Ala Leu Met Thr Asp Ser Gln Asp Trp Trp Pro Ala Asp			
85	90	95	
Tyr Gly His Tyr Gly Pro Phe Phe Ile Arg Met Ala Trp His Ser Ala			
100	105	110	
Gly Thr Tyr Arg Ile Gly Asp Gly Arg Gly Gly Gly Ser Gly Ser			
115	120	125	
Gln Arg Phe Ala Pro Leu Asn Ser Trp Pro Asp Asn Ala Asn Leu Asp			
130	135	140	
Lys Ala Arg Leu Leu Trp Pro Ile Lys Gln Lys Tyr Gly Arg Lys			
145	150	155	160

Ile Ser Trp Ala Asp Leu Met Ile Leu Thr Gly Asn Val Ala Leu Glu  
 165 170 175

Thr Met Gly Phe Lys Thr Phe Gly Phe Ala Gly Gly Arg Ala Asp Val  
 180 185 190

Trp Glu Pro Glu Glu Asp Val Tyr Trp Gly Ala Glu Thr Glu Trp Leu  
 195 200 205

Gly Asp Lys Arg Tyr Glu Gly Asp Arg Glu Leu Glu Asn Pro Leu Gly  
 210 215 220

Ala Val Gln Met Gly Leu Ile Tyr Val Asn Pro Glu Gly Pro Asn Gly  
 225 230 235 240

Lys Pro Asp Pro Ile Ala Ala Arg Asp Ile Arg Glu Thr Phe Gly  
 245 250 255

Arg Met Ala Met Asn Asp Glu Glu Thr Val Ala Leu Ile Ala Gly Gly  
 260 265 270

His Thr Phe Gly Lys Thr His Gly Ala Ala Asp Ala Glu Lys Tyr Val  
 275 280 285

Gly Arg Glu Pro Ala Ala Gly Ile Glu Glu Met Ser Leu Gly Trp  
 290 295 300

Lys Asn Thr Tyr Gly Thr Gly His Gly Ala Asp Thr Ile Thr Ser Gly  
 305 310 315 320

Leu Glu Gly Ala Trp Thr Lys Thr Pro Thr Gln Trp Ser Asn Asn Phe  
 325 330 335

Phe Glu Asn Leu Phe Gly Tyr Glu Trp Glu Leu Thr Lys Ser Pro Ala  
 340 345 350

Gly Ala Tyr Gln Trp Lys Pro Lys Asp Gly Ala Gly Ala Gly Thr Ile  
 355 360 365

Pro Asp Ala His Asp Pro Ser Lys Ser His Ala Pro Phe Met Leu Thr  
 370 375 380

Thr Asp Leu Ala Leu Arg Met Asp Pro Asp Tyr Glu Lys Ile Ser Arg  
 385 390 395 400

Arg Tyr Tyr Glu Asn Pro Asp Glu Phe Ala Asp Ala Phe Ala Lys Ala  
 405 410 415

Trp Tyr Lys Leu Thr His Arg Asp Met Gly Pro Lys Val Arg Tyr Leu  
 420 425 430

Gly Pro Glu Val Pro Gln Glu Asp Leu Ile Trp Gln Asp Pro Ile Pro  
 435 440 445

Asp Val Ser His Pro Leu Val Asp Glu Asn Asp Ile Glu Gly Leu Lys  
 450 455 460

Ala Lys Ile Leu Glu Ser Gly Leu Thr Val Ser Glu Leu Val Ser Thr  
 465 470 475 480

Ala Trp Ala Ser Ala Ser Thr Phe Arg Asn Ser Asp Lys Arg Gly Gly  
 485 490 495

Ala Asn Gly Ala Arg Ile Arg Leu Ala Pro Gln Lys Asp Trp Glu Val  
 500 505 510

Asn Asn Pro Gln Gln Leu Ala Arg Val Leu Lys Thr Leu Glu Gly Ile  
 515 520 525

Gln Glu Asp Phe Asn Gln Ala Gln Ser Asp Asn Lys Ala Val Ser Leu  
 530 535 540

Ala Asp Leu Ile Val Leu Ala Gly Cys Ala Gly Val Glu Lys Ala Ala  
 545 550 555 560

Lys Asp Ala Gly His Glu Val Gln Val Pro Phe Asn Pro Gly Arg Ala  
 565 570 575

Asp Ala Thr Ala Glu Gln Thr Asp Val Glu Ala Phe Glu Ala Leu Glu  
 580 585 590

Pro Ala Ala Asp Gly Phe Arg Asn Tyr Ile Lys Pro Glu His Lys Val  
 595 600 605

Ser Ala Glu Glu Met Leu Val Asp Arg Ala Gln Leu Leu Ser Leu Ser  
 610 615 620

Ala Pro Glu Met Thr Ala Leu Val Gly Gly Met Arg Val Leu Gly Thr  
 625 630 635 640

Asn Tyr Asp Gly Ser Gln His Gly Val Phe Thr Asn Lys Pro Gly Gln  
 645 650 655

Leu Ser Asn Asp Phe Phe Val Asn Leu Leu Asp Leu Asn Thr Lys Trp  
 660 665 670

Arg Ala Ser Asp Glu Ser Asp Lys Val Phe Glu Gly Arg Asp Phe Lys  
 675 680 685

Thr Gly Glu Val Lys Trp Ser Gly Thr Arg Val Asp Leu Ile Phe Gly  
 690 695 700

Ser Asn Ser Glu Leu Arg Ala Leu Ala Glu Val Tyr Gly Cys Ala Asp  
 705 710 715 720

Ser Glu Glu Lys Phe Val Lys Asp Phe Val Lys Ala Trp Ala Lys Val  
 725 730 735

Met Asp Leu Asp Arg Phe Asp Leu Lys  
 740 745